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In **Hoverfly Newsletter No. 19** the subject of common names for British hoverflies was aired, and the translation of the German language names for a number of species, quoted from **Schwebfliegen Mitteleuropas** by Kurt Kormann, were included. There has been no subsequent correspondence in these pages on the matter, though readers' views are of course welcomed. Since then I have come across lists of common names for hoverflies in two other publications: Ernst Torp's book on the Danish species (see review on page 7), and a list of species at a nature reserve in China, which includes Chinese language names for the species involved. Examples of (crude) translations of some of these names are as follows: *Episyrphus balteatus*: the double-banded hoverfly (Danish), the common winter hoverfly (German), the black-banded drop-sided hoverfly (Chinese); *Scaeva pyrastri:* the white-spotted farm hoverfly (Danish), the late large frons hoverfly (German), the step-variegated drum-shaped frons hoverfly (Chinese); *Eristalinus sepulchralis*: the manure mud fly (Danish), the matt foul mud hoverfly (German), the six-striped bright hoverfly (Chinese); *Eristalis tenax:* the drone fly (Danish - as in English), the bee-like wedge-spotted hoverfly (German), the long tailed naked awn hoverfly (Chinese).

Page 6 of this newsletter provides details, from Francis Gilbert, of an electronic mail discussion forum on the subject of hoverflies. A number of readers probably already subscribe to this, and hopefully more will now join. Do not however let the existence of the bulletin board deter you from sending articles for publication in this newsletter! Copy for **Hoverfly Newsletter No. 25** should be sent to me: **David Iliff, Green Willows, Station Road, Woodmancote, Cheltenham, Glos, GL52 4HN**, to reach me by 9th December 1997 (or they can be handed to me on Dipterists' Day on 1st November).

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DATABASES: THE PROBLEM OF MULTI-REPLICATION OF RECORDS

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Having considerably increased the number of records on my hoverfly database, I am now trying to update the Atlas of the Hoverflies of Scotland. However this time I am noticing an increasing problem of duplication and multiplication of records.

A record might be described as the existence of the capture of a specimen of a species, or the information relating to the existence of a specimen of a species, at a particular time at a particular site. Some people might add "taken by a particular person", but this itself is a form of duplication that I will come back to later. A duplicate record is one that describes the same event, of a specimen capture, but which comes from a different source. It is not simply a "copy and paste" typing error.

How do these duplicate records arise?

Duplication arises from a number of sources, e.g. when a collector goes into the field and makes a field record in his field notebook of the existence of a species at a particular site on a particular day. He might also take one or more specimens in his net which are later mounted up, identified and catalogued. This is now the first source of duplication. Our collector now sends his list of records from his field notebook to the Local Record Centre (LRC) and/or to the national Biological Records Centre (BRC). Later, usually during the winter months, he sorts out his summer captures, mounts and identifies them and produces another list which he also sends to the LRC and/or BRC. The record centre now has two records relating to the same event, i.e. a field record and a specimen record. Our collector meanwhile writes an article for a journal or newsletter which relates to this record. Someone, possibly in the record centre, includes in the database all the published records he comes across. So now we have 3 records of the same event, i.e. a triplicate record. Later our collector donates his collection to a museum and the curator catalogues his collection and sends all records to the LRC and/or BRC. Therefore there may now be 4 records of the same event.

On top of this the LRC sends its records to the BRC, which immediately creates 5 records relating to the same capture event. Multiplication does not stop there, especially when it comes to literature records, because the same record can appear in various articles in different journals, all of which can lead to multiplication of the original record.

A pseudo-multiplication of the record also occurs at the original time of capture when other collectors on the same day, in the same place, take specimens of the same species. This can lead to the same trail of multiplications that I have already described. I have called this a pseudo-duplicate because it, depending on your original definition of a record, comes from a different collector. For mapping purposes, should two records of the same species taken by different collectors be treated as different from one record

of two specimens taken by one collector? From a database point of view "yes", but for statistical analysis "no".

Why should there be a problem? No reason, really, if all you are likely to be doing with the database is build up a database of records from various sources. The problem arises when you want to map these multi-replicates. Multi-replicate records pose no problem if all you do is produce a dot map of the existence of a species from a particular site. Nor does it pose a problem if one is simply producing a list of species from a particular site. These are the two main uses most people make of a database. The problem arises when one is trying to analyse the data held in a database to produce, for instance, flight periods, altitude ranges or habitat preferences of a species, which today's more sophisticated maps are trying to show. Why? Because the analysis becomes biased by those multi-replicates which relate only to a particular time of year, or particular altitude or habitat. This leads to exaggerated graphs of flight periods, etc. For instance a graph of flight period might appear to show a species as being most abundant during the end of June, when in fact it is the effect of all the multi-replicates for that particular time of year.

So what do database managers do about this problem?

Firstly we have to identify duplicate records. This is not as easy as it sounds, since multi-replicates do not appear as exact duplicates. One or more fields of information relating to a particular record usually differ. This commonly is the "source of the record" field, i.e. is it a museum record, a field record or a literature record? However it is not as simple as this since each source does not contain all the same information for each of the other fields. For instance, one record of a multi-record could give the altitude that the specimen was taken at, or it could give greater habitat detail, or it could contain the exact date of capture, whereas some literature records just give the year or month. All these differences pose the problem of deciding if one record is a duplicate of another or a genuine new record.

Having decided that 4 or 5 records all refer to the same original event, what does one do? Does one chose one record and delete all the rest? No, because each record obviously contains some unique information, e.g. the source field is different. Does one amalgamate all the records into one super-record? This is not as simple as it sounds, e.g. what does one list as the "source of record": field, collector, literature or museum record? The "publication" field obviously grows enormously with time. The "date" field should present no problem since one should list the most accurate date from the list of multi-replicates. Or does it? I have known literature records collected by certain collectors without a complete exact date. The date is often listed as the period when the collector was in that particular area, which can often cover many months. If one deletes this information in preference for the exact date of capture, obtained from the museum record, then one not only loses the information relating to the fact that the collector was in that area during those months, but also the fact that, since the collector did not collect any more specimens during the rest of the time period bar the one real date record, that particular species was either rare or not flying during the rest of the time period. This in itself is important information.

Keep all the information, I hear you say. This is commendable, but it means creating more fields of information. It means that the size of the records in the database starts to expand enormously.

Do you create a new record, made up of all the replicate records, call this the prime record and list all the other records as duplicates? This is possibly one solution, but your database is now expanding and therefore creating problems of memory size and processor processing time to run sorting and searching packages. It is more expensive to produce output - more ink, more paper, more storage facilities, etc., not to mention expensive management time required to deal with multi-replicates.

The simplest database to manipulate will always be one record for one event.

There is still the problem created by pseudo-multi-replicates. This usually occurs on a field meeting with many people collecting different specimens of the same species at the same site on the same date. Are these true records, or just a form of multi-record? Each resulting record can be different, apart from the "collector" field. Each collector might describe the habitat differently. This might be for reasons of personal observation or opinion, or might be quite genuine because the mini- or micro-habitat was different. The same name for the same site might not be used by different collectors. This can be a major headache for the database manager. Different degrees of accuracy for the grid reference field might arise. The fact that many pseudo-multi-replicates exist is valuable information, especially when one analyses the flight period, because it indicates the number of specimens flying on a particular date. If one were to create a prime record, does one add up all the numbers and sexes and amalgamate them into a "number" and a "sex" field? But this would give a negative bias when plotting out a flight period, since flight periods are usually plotted by the number of records for each time period and not by the number in the number field.

Multi-replicates also give rise to problems with the "collector" field in the database. The British Dipterists list all the collectors for a species from a site. This creates a large "collector" field, which poses a problem both for printing out and for sorting purposes. An alphabetical sort of the "collector" field will produce a list with the same collector in different parts of the resulting catalogue. Using a SEARCH and not a SORT BY criterion will not produce a catalogue by collector without a lot of extra manipulation of the database. Other problems arise from pseudo-multi-replicates. Sometimes a small group of 3 or 4 collectors collecting together lists everyone as the collector; this produces one record. The genuine collector then goes on to write a literature article referring to the record and gives the collector as himself. This ends up as two records on the LRC database. Does one amalgamate these two records by deleting all the collectors in the group with the exception of the literature reference collector, with the resulting loss of information as to who was out collecting that day? How does one decide whether only the literature record collector took that species; perhaps all the members of the group took that particular species; this in itself is important information.

These are some problems I have encountered with my database of hoverflies, concerned with analysing the data, which contains some 35,000 records. I have

estimated the number of multi-replicates for some of the species in my database; this does not take account of pseudo-multi-replicates. They are as follows:

Anasimyia contracta	13%	*Callicera rufa*	38%
Anasimyia lineata	22%	*Chalcosyrphus nemorum*	16%
Anasimyia transfuga	57%	*Chamaesyrphus caledonicus*	33%
Arctophila superabiens	18%	*Cheilosia illustrata*	6%
Brachyopa insensilis	10%	*Episyrphus balteatus*	6%
Brachyopa pilosa	18%	*Eristalis pertinax*	6%
Brachyopa scutellaris	0%	*Platycheirus cyaneus*	7%
Brachypalpoides lenta	17%		

Generally speaking the rarer species have more multi-replicates than the commoner ones. This means that data analysis of the rarer species will generally be more affected by the presence of multi-replicates. The national hoverfly database contains over 300,000 records! How many of these are multi-replicates and how does the database manage multi-replicates?

MICRODON MUTABILIS: A CASE OF SEXUAL AGGRESSION

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During the afternoon of 2nd June 1997, a warm sunny day, on Arnside Knott (Arnside, Cumbria), in an area of limestone grassland locally known as "The Pig Field" because at one time pigs were kept there, I spotted a female *Microdon mutabilis* walking about in the short turf. Being aware of the genus's association with ants I wondered if this insect was possibly searching for an ants' nest.

However, after I had observed it for only five or six seconds, suddenly another insect dived down on to it at great velocity and both insects rolled around on the ground for a few seconds in what looked like a kind of high speed wrestling match. No details of what was actually happening between the two could be discerned. My first thought was that I was watching an attack on the hoverfly by a predator. I was surprised, therefore, to discover, when the wrestling was over, that the assailant was a male *M. mutabilis*, and that the two insects were now sexually joined.

What I found amazing was the speed and ferocity of the male's attentions. Was my initial thought that the female was attempting to locate an ants' nest wrong? Was she, rather, sending out sexual signals to any passing male *M. mutabilis* and I just happened to be watching when a male responded? Or was the male's eyesight acute enough to spot the female while she was busy searching, having already mated, and the ensuing struggle her attempt to resist the male's advances?

I put the insects into a tube for closer examination later. After two hours or so I discovered that the pair had separated.

I would be interested to hear from anyone who has observed the mating practice of *M. mutabilis*. Was the aggressive and violent behaviour I had observed the normal routine, or had I been witness to a case of insect rape?

FINDING *CRIORHINA RANUNCULI*

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I offer the following comments in response to David Iliff's article on "Finding (or not) early spring species" (**Hoverfly Newsletter No. 23**), in the particular case of *Criorhina ranunculi*.

The earliest date in a year that I have seen it is 16 March (1995); the hoverfly was on laurel (*Prunus laurocerasus*) that was in flower. I also have records for 5 May 1996, 7 May 1996 (3 specimens) and 14 May 1996.

All these records are from the Thursley-Elstead area, and include both the red-tailed and white-tailed forms. In sunny conditions *C. ranunculi* can sometimes be found resting on the leaves of laurel or *Rhododendron*.

A NEW DISCUSSION FORUM FOR SYRPHID WORKERS

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An electronic mail bulletin board has been set up for all those interested in discussing all issues connected with the Syrphidae, and anyone who has access to email can join. It is based in Nottingham, and all that is necessary is for a message to be sent to *Majordomo@nottingham.ac.uk* that contains the message *subscribe syrphidae*. You will then be added to the list automatically, and will receive details of how to send messages to the list (whose address is *syrphidae*@nottingham.ac.uk).

BOOK REVIEW: "DANMARKS SVIRREFLUER" BY ERNST TORP

Hoverfly Newsletter No. 4 (October 1986) contained a review (by Philip Entwistle) of **De Danske Svirrefluer** (Danish Hoverflies) by Ernst Torp. The very favourable review included the recommendation that the book "should be added to the library of all those who take more than a provincial view of syrphid questions.....". Those who were taking this newsletter in the eighties may well wonder why the book is now, apparently, being reviewed again. However readers with sharp eyes may have noticed that the title, **Danmarks Svirrefluer** (Denmark's Hoverflies) is slightly different; it is also Volume 6 in a series of books on the Danish fauna; the book reviewed in 1986 was Volume 1 in that series. **Danmarks Svirrefluer** (published by Apollo Books, 1994) is therefore not merely an updated reprint of the earlier publication, but essentially a new book.

The new book contains almost everything that appeared in its predecessor, in updated form, but also many enhancements and additional features. It runs to 490 pages (compared with 300 pages in the case of the earlier volume), and is much more lavishly illustrated. There are colour plates depicting 351 pinned hoverfly specimens; these show all the 270 species on the Danish list (with varieties of species included, as are, in many cases, both sexes, especially where there is sexual dimorphism). As far as I know this is the first hoverfly book to be published to illustrate in colour all the species that it covers. In addition there are 25 excellent colour photographs of hoverflies; a number of these (by Rolf Nagel) are of insects in flight - not hovering, but taking off from a perch.

The text is in Danish, but the extensive section dealing with descriptions of the species has a paragraph in English for each species covering its status, distribution and plant associations.

I can only repeat the warm recommendation made for the earlier book, but even more strongly for this bigger and even better successor. The quality of this excellent book is well represented by the striking photograph on the back of the dust jacket of the wasp mimic species *Temnostoma vespiforme*, one of three members of the genus that are present in Denmark. Perhaps those of us in these islands tempted to feel envious of Denmark having such exotic hoverflies can console ourselves that neither *Volucella zonaria* nor *Criorhina ranunculi* are on the Danish list!

"VOLUCELLA" : A FURTHER OPPORTUNITY TO SUBSCRIBE

The German newsletter **Volucella** was reviewed in **Hoverfly Newsletter No. 23**. I have since received a letter from Dieter Doczcal, one of the co-editors, who tells me that the review brought several new subscribers. A detachable order form for the use of any further readers who may be interested in subscribing to **Volucella** is printed after the final page of this newsletter.

INTERESTING RECENT RECORDS

From John Herbert:

Middlesex:

Epistrophella euchroma	Hounslow Heath LNR	12 April 1997, 1 male on birch 13 April 1997, 2 males on cherry blossom 17 April 1997, 1 female on cherry
Didea fasciata	Hounslow Heath LNR	April 1997, 2 males, 1 female
Platycheirus ambiguus	Hounslow Heath LNR	April 1996, April 1997
Chrysotoxum cautum	Hounslow Heath LNR	25 May 1997, 1 female
Cheilosia mutabilis	Hounslow Heath LNR	June 1996 (confirmed by Roger Morris); 11 June 1997, 2 males on bramble

From Barry Brigden:

Lancashire:

Criorhina ranunculi:	Gait Barrows NNR	20 April 1996 (4); 12 May 1996 (1)
Xanthogramma citrofasciatum:	Yealand Hall Allotment	6 May 1995
Xanthogramma pedisequum:	Gait Barrows NNR	18 July 1996 (2), 25 July 1996, 26 May 1997
Mallota cimbiciformis:	Red Seed Woods, Preston	3 August 1996
Doros profuges:	Yealand Hall Allotment	31 May 1997
Microdon mutabilis:	Gait Barrows NNR	31 May 1997

From Cumbria:

Eumerus ornatus:	Witherslack Woods	25 July 1996
Microdon mutabilis:	Arnside Knott	2 June 1997 (pair in copula)
	Beetham	31 May 1997
Criorhina berberina var. oxyacanthae:	Beetham	31 May 1997

From Essex:

Platycheirus ambiguus:	Little Beddow Heath	8 May 1996